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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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Office Action Summary	Application No. 10/727,152	Applicant(s) ZHENGDI, QIN
	Examiner SOPHIA VLAHOS	Art Unit 2611

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 April 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 3-26* is/are pending in the application.

4a) Of the above claim(s) *2* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-5,9-19 and 23-26* is/are rejected.

7)☒ Claim(s) *6-8 and 20-22* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see "Remarks", filed 4/26/2007 with respect to the rejection(s) of independent claim(s) 1, 12 and 16 under 35 U.S.C 102(b) have been fully considered and are persuasive, section IV starting on page 11 through page 12, second paragraph of page 12 addressing the limitation of claim 1, "different types of equations...are provided for different distributions..." not expressly taught by Tiemann et. al. (U.S. 6,118,808) . Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Tiemann et. al., (U.S. 6,118,808) and the document "Curve Fitting Toolbox" July 2001 Version 1.

2. The objection to claims 3-5, 9-10 is withdrawn in view of their amendment.

Specification

3. The amendment to the specification received on 4/26/2007 is accepted.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 3-5, 9-11, 12-19, 23-25, 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tiemann et. al., (U.S. 6,118,808) in view of "Curve Fitting Toolbox" July 2001 Version 1.

With respect to claim 1, Tiemann et. al., disclose: taking samples of said received signal (see column 12, lines 3-7, where every sample of the received signal corresponds to each 1.0ms segment stored in the signal memory and processed by elements 23,29,30 (in the system of Fig. 4)); determining at least three samples, of which at least one has a signal strength exceeding a threshold value (see column 12, lines 13-16, function of block 31 of Fig. 4, where the determination of the at least three samples of which at least one has signal strength exceeding a threshold is preformed sequentially by the threshold detector, and see Fig. 14 where the dots are the accumulated correlation samples, see column 18, lines 33-44); and determining the position of said pulse peak based on an interpolation of at least two of said determined samples (see column 18, lines 45-66, the determination of the autocorrelation peak corresponds to the determining of the pulse peak (see lines 45-49)), which at least two samples are selected based on the signal strengths of said at least three determined samples, and which interpolation includes an evaluation of the signal strength of said at least two samples (see column 18, lines 50-53, see searching for the two largest adjacent entries, and A,B and C,D define line equations (i.e. the values of A,B, C,D are used to compute the line equations) that intersect at the pulse peak).

Tiemann et. al., do not expressly disclose: wherein different types of equations for said interpolation are provided for different distributions of the signal strengths of said at least determined samples.

Solving the same problem (curve-fitting , data interpolation) the document "Curve Fitting Toolbox" discloses: wherein different types of equations for said interpolation are provided for different distributions of the signal strengths of said at least three determined samples (page 3-1, "Fitting Data" first paragraph, pages 3-68 through 3-72, section non-parametric fitting, and Figure on page 3-69 where a fitting example is shown, see also the first paragraph on same page where the different types of equations (this corresponds to the types of interpolants mentioned on the first paragraph of page 3-69) are provided for different distributions of the signal strengths of said at least three determined samples (see that the nearest neighbor interpolation does not follow the data (distribution of signal strengths) as well as the shape-preserving interpolant)).

Therefore, at the time of the invention, it would have been obvious to a person skilled in the art to modify the system of Tiemann et. al., based on the teachings of the document "Curve Fitting Toolbox" so that different types of equations for said interpolation are provided for different distributions of the signal strengths of said at least three determined samples, and the motivation to perform such a motivation is that various interpolation methods are known to those skilled in the art (this is mentioned by Tiemann et. al., see column 18, lines 49-50) and the choice of the specific interpolation mentod (selection of interpolant) "depends on the characteristics of the data being fit,

the required smoothness of the curve, speed considerations, postfit analysis requirements, and so on. The linear and nearest neighbor methods are fast, but the resulting curves are not very smooth. The cubic spline and shape-preserving methods are slower, but the resulting curves are often very smooth." (Curve Fitting Toolbox, page 3-69 first paragraph).

With respect to claim 3, Tiemann et. al., disclose: wherein said at least two samples are selected based in addition on a model for a pulse shape (see fig. 4, the triangle function, see column 18, lines 41-44).

With respect to claim 4, Tiemann et. al., disclose: wherein equations for said interpolation are determined based on a model for a pulse shape (see fig. 4, the triangle function , see column 18, lines 41-44).

With respect to claim 5,Tiemann et. al., disclose: wherein said model of said pulse shape has a triangular shape (see triangle shape shown in Fig. 4).

With respect to claim 9, Tiemann et. al., disclose: wherein a weighting of the signal strengths of samples used in said interpolation is performed before said interpolation based on known deviations between said model of said pulse shape and a real pulse shape (see Fig. 14, where the solid line (triangle function) corresponds to the model of the pulse shape and the real pulse shape corresponds to the pulse shape(s)

obtained using the "x" the typical samples (see the "x" distributions at each one of points A,B, C, D and so on, where the values of x are known and so is the model of the pulse (solid line) therefore the deviations between the model and the real pulse shape is known) are normalized (weighted) to obtain the dots, and see that for example the dots at points C, D, where at point C the weighting moves the dot upwards towards the two topmost xx, whereas at point D the weighting moves the dot downwards towards the xxxx points).

With respect to claim 10, all of the limitations of claim 10, are analyzed above in claim 4,and the combination of Tiemann et. al., and the "Curve Fitting Toolbox" disclose: wherein a correction of a position determined based on said interpolation is performed based on known deviations between said model of said pulse shape and a real pulse shape and based on the signal strengths of said samples (see page 3-73, third paragraph where it is mentioned that the level of smoothing of the fitting applied to the data points can be changed (corrected)).

With respect to claim 11, Tiemann et. al., disclose: , wherein said at least three samples are consecutive samples (see column 12, lines 13-20, where the threshold detector consecutively checks the thresholds and supplies samples to the control 35, that performs the search and interpolation).

With respect to claim 12, the limitations of apparatus claim 12 are rejected based on a rationale similar to the one used to reject method claim 1 above.

With respect to claim 13, Tiemann et. al., disclose: wherein said apparatus is a receiver receving said signal (see column 3, lines 4-7, discussing the conventional acquisition apparatus used in a GPS, receiver, and Fig. 4 is an embodiment of the present invention, which is (part of) a GPS receiver, see also abstract).

With respect to claim 14, all of the limitations of claim 14, are analyzed above in claim 12, and Tiemann discloses: wherein said device is a device external to said receiver and comprises further a receiving component configured to receive from said receiver information on said received signal (see Fig. 4, GPS receiver structure, separate block RF/IF supplying signals to components 33,23,29, 30, 31, and 35 that perform the search and interpolation).

With respect to claim 15, Tiemann et. al., discloses: wherein said device is a network element of a cellular communication system (see column 3, lines 4-7, discussing the conventional acquisition apparatus used in a GPS receiver (network element), and Fig. 4 is an embodiment of the present invention, which is (part of) a GPS receiver (considered to be a network element), see also abstract)

With respect to claim 16, Tiemann et. al., disclose: Cellular communication system comprising an apparatus according to claim 12 (see abstract invention relates to a receiver in a GPS system, see also column 9, lines 6-7, discussing the conventional acquisition apparatus used in a GPS receiver and Fig. 4 is an embodiment of the present invention, which is (part of) a GPS receiver).

With respect to apparatus claims 17-19, 23-25, these claims are rejected based on a rationale similar to the one used to reject method claims 3-5, 9-11 above respectively.

Apparatus claim 26 is rejected based on a rationale similar to the one used to reject apparatus claim 12 above.

Allowable Subject Matter

6. Claims 6-8, 20-22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Abraham et. al., (U.S. 7,006,556) discloses a method and apparatus for

determining the position of a correlation peak by fitting the data using least squares method (interpolation).

Kang et. al., (U.S.2003/0043889) disclose: a method and apparatus for determining energy peaks by interpolating neighboring (left and right "shoulder") peaks.

Freiberg et. al., (EP 1089452) disclose: a method of determining cross-correlation peaks by using quadratic approximation/curve fitting.

Saitou (U.S. 2003/0123408) discloses: a system determining a peak timing position using interpolation of received (power or amplitude) samples.

Yang (U.S. 6,407,699) discloses: a system that determines a correlation peak in a multipath environment by interpolating two adjacent peaks of the triangular correlation function.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SOPHIA VLAHOS whose telephone number is 571 272 5507. The examiner can normally be reached on MTWRF 8:30-17:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammed Ghayour can be reached on 571 272 3021. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SV
7/10/2007

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SUPERVISORY PATENT EXAMINER